CLAIMS

1. An air conditioner for an automobile having a passenger compartment, the air conditioner comprising:

an air control system to control a property of air entering the passenger compartment;

a manual setting member through which the property of the air is manually controlled;

a control system that automatically controls the property of the air based on a control characteristic, wherein the control system updates the control characteristic based on an input from the manual setting member and based on a variable learning rate.

2. The air conditioner in claim 1, wherein the variable learning rate is based on a first input from the manual setting member and a second input from the manual setting member, wherein the first input from the manual setting member corresponds to a time value measured between a first adjustment of the manual setting member and a second adjustment of the manual setting member, wherein the second input from the manual setting member corresponds to a magnitude of the second adjustment of the manual setting member.

3. The air conditioner in claim 2, further comprising

a second air control system to control a second property of the air entering the passenger compartment;

a second manual setting member through which the second property of the air is manually controlled;

a second control system that automatically controls the second property of the air based on a second control characteristic, wherein the second control system updates the second control characteristic based on an input from the second manual setting member and based on a second variable learning rate.

4. The air conditioner in claim 3, wherein the second variable learning rate is based on a first input from the second manual setting member and a second input from the second manual setting member, wherein the first input from the second manual setting member corresponds to a time value measured between a first adjustment of the second manual setting member and a second adjustment of the second manual setting member, wherein the second input from the second manual setting member corresponds to a magnitude of the second adjustment of the second manual setting member.

5. The air conditioner in claim 4, wherein the property of the air entering the passenger compartment is volumetric flow rate.

6. The air conditioner in claim 5, wherein the second property of the air entering the passenger compartment is temperature.

7. The air conditioner in claim 4, wherein the variable learning rate is determined by the formula: $VLR=k1*(T_{elapsed}*k2 + \Delta N*k3)$, wherein the VLR is the variable learning rate, the k1 is a constant, the k2 is a constant, the k3 is a constant, the $T_{elapsed}$ is the first input from the manual setting member, and the ΔN the second input from the manual setting member.

8. The air conditioner in claim 7, wherein the second variable learning rate is determined by the formula: $VLR=k4*(T_{elapsed}*k5 + \Delta N*k6)$, wherein the VLR is the second variable learning rate, the k4 is a constant, the k5 is a constant, the k6 is a constant, the $T_{elapsed}$ is the first input from the second manual setting member, and the ΔN the second input from the second manual setting member.

9. The air conditioner in claim 2, further comprising

a second air control system to control a second property of air entering the passenger compartment;

a second manual setting member through which the second property of the air is manually controlled;

a second control system that automatically controls the second property of the air based on a second control characteristic, wherein the second control system updates the second control characteristic based on an input from the second manual setting member and based on the variable learning rate.

10. The air conditioner in claim 9, wherein the variable learning rate is based on a first input and a second input from at least one of the first manual setting member and the second manual setting member, wherein the first input from at least one of the first manual setting member and the second manual setting member corresponds to a time value measured between a first adjustment of one of the first manual setting member and the second manual setting member and a second adjustment of one of the first manual setting member and the second manual setting member, wherein the second input from the at least one of the first manual setting member and the second manual setting member corresponds to a magnitude of the second adjustment of one of the first manual setting member and the second manual setting member.

11. An air conditioner for an automobile having a passenger compartment, the air conditioner comprising:

a blower to direct air into the passenger compartment at a volumetric flow rate;

a manual setting blower member through which the volumetric flow rate of the air directed into the passenger compartment is manually controlled;

a measurement system to measure an environmental condition; and

a control system that automatically controls the volumetric flow rate of the air directed into the passenger compartment based on a control characteristic, wherein the control characteristic is based on a plurality of preferred blower settings, wherein each of the plurality of preferred blower settings corresponds to a corresponding range of values of the environmental condition and each of the plurality of preferred blower settings is determined based on a signal from the manual setting blower member occurring when the environmental condition is within the corresponding range of values of the environmental condition, wherein the plurality of preferred blower settings are updated at a variable learning rate, wherein the variable learning rate is based on a first input from the manual setting blower member and a second input from the manual setting blower member, wherein the first input from the manual setting blower member corresponds to a time value measured between a first adjustment of the manual setting blower member and a second adjustment of the manual setting blower member, wherein the second input from the manual setting blower member corresponds to a magnitude of the second adjustment of the manual setting blower member.

12. The air conditioner in claim 11, further comprising:

a temperature controller to control a temperature of the air directed into the passenger compartment;

a manual setting temperature member through which the temperature of the air directed into the passenger compartment is manually controlled; and

a second control system that automatically controls the temperature of the air directed into the passenger compartment based on a second control characteristic, wherein the second control characteristic is based on a plurality of preferred temperature settings, wherein each of the plurality of preferred temperature settings corresponds to the corresponding range of values of the environmental condition and each of the plurality of preferred temperature settings is determined based on a signal from the manual setting temperature member occurring when the environmental condition is within the corresponding range of values of the environmental condition, wherein the plurality of preferred temperature settings are updated at a second variable learning rate, wherein the second variable learning rate is based on a first input from the manual setting temperature member and a second input from the manual setting temperature member, wherein the first input from the manual setting temperature member corresponds to a time value measured between a first adjustment of the manual setting temperature member and a second adjustment of the manual setting temperature member, wherein the second input from the manual setting temperature member corresponds to a magnitude of the second adjustment of the manual setting temperature member.

13. The air conditioner in claim 12, wherein the control characteristic is an algorithm corresponding to the plurality of preferred blower settings, wherein the algorithm is determined using a least squares curve fit calculation.

14. The air conditioner in claim 13, wherein the second control characteristic is a second algorithm corresponding to the plurality of preferred temperature settings, wherein the second algorithm is determined using the least squares curve fit calculation.

15. The air conditioner in claim 11, wherein the environmental condition is selected from a group consisting of an ambient temperature adjacent the automobile, a sun load adjacent to the automobile, a temperature in the passenger compartment of the automobile, and humidity in the passenger compartment of the automobile.

16. The air conditioner in claim 12, further comprising:

a second measurement system to measure a second environmental condition;

wherein the control system controls the volumetric flow rate of the air directed into the passenger compartment is based on a third control characteristic, wherein the third control characteristic is based on a second plurality of preferred blower settings, wherein each of the second plurality of preferred blower settings corresponds to a second corresponding range of values of the second environmental condition and each of the second plurality of preferred blower settings is determined based on the signal from the manual setting blower member occurring when the second environmental condition is within the second corresponding range of values of the second environmental condition, wherein the second plurality of preferred blower settings are updated at the variable learning rate.

17. The air conditioner in claim 16, wherein the second control system that automatically controls the temperature of the air directed into the passenger compartment is based on a fourth control characteristic, wherein the fourth control characteristic is based on a second plurality of preferred temperature settings, wherein each of the second plurality of preferred temperature settings corresponds to the second corresponding range of values of the second environmental condition and each of the second plurality of preferred temperature settings is determined based on the signal from the manual setting temperature member occurring when the second environmental condition is within the second corresponding range of values of the second environmental condition, wherein the second plurality of preferred temperature settings are updated at the second variable learning rate.

18. The air conditioner in claim 17, wherein the environmental condition is selected from a group consisting of an ambient temperature adjacent the automobile, a sun load adjacent to the automobile, a temperature in the passenger compartment of the automobile, and a humidity in the passenger compartment of the automobile; and

wherein the second environmental condition is selected from a group consisting of an ambient temperature adjacent the automobile, a sun load adjacent to the automobile, a temperature in the passenger compartment of the automobile, and humidity in the passenger compartment of the automobile.

19. The air conditioner in claim 17, further comprising:

a third measurement system to measure a third environmental condition;

wherein the control system controls the volumetric flow rate of the air directed into the passenger compartment is based on a fifth control characteristic, wherein the fifth control characteristic is based on a third plurality of preferred blower settings, wherein each of the third plurality of preferred blower settings corresponds to a third corresponding range of values of the third environmental condition and each of the third plurality of preferred blower settings is determined based on the signal from the manual setting blower member occurring when the third environmental condition is within the third corresponding range of values of the third environmental condition, wherein the third plurality of preferred blower settings are updated at the variable learning rate.

20. The air conditioner in claim 19, wherein the second control system that automatically controls the temperature of the air directed into the passenger compartment is based on a sixth control characteristic, wherein the sixth control characteristic is based on a third plurality of preferred temperature settings, wherein each of the third plurality of preferred temperature settings corresponds to the third corresponding range of values of the third environmental condition and each of the third plurality of preferred temperature settings is determined based on the signal from the manual setting temperature member occurring when the third environmental condition was within the third corresponding range of values of the third environmental condition, wherein the third plurality of preferred temperature settings are updated at the second variable learning rate.

21. The air conditioner in claim 20, wherein the environmental condition is selected from a group consisting of an ambient temperature adjacent the automobile, a sun load adjacent to the automobile, a temperature in the passenger compartment of the automobile, and a humidity in the passenger compartment of the automobile;

wherein the second environmental condition is selected from a group consisting of an ambient temperature adjacent the automobile, a sun load adjacent to the automobile, a temperature in the passenger compartment of the automobile, and a humidity in the passenger compartment of the automobile; and

wherein the third environmental condition is selected from a group consisting of an ambient temperature adjacent the automobile, a sun load adjacent to the automobile, a temperature in the passenger compartment of the automobile, and humidity in the passenger compartment of the automobile.